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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/927,201
Filing Date: August 10, 2001
Appellant(s): BAER, RICHARD L.

Gerald Glanzman
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 10/30/2006 appealing from the Office action mailed June 16, 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

No evidence is relied upon by the examiner in the rejection of the claims under appeal.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 7, 8, 17, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kasahara et al. (US Patent # 6,710,818) in view of Iwakawa et al. (US Patent # 6,208,433).

[Claim 1]

Kasahara discloses a method for removing image artifacts from an image of a scene illuminated by a periodically varying light source, said image represented by an image data array comprising a plurality of rows of image data, the method comprising:

determining a flicker function that models light emission of the periodically varying light source (e.g., column 8, line 28 – column 9, line 10), wherein said flicker function is a function of flicker amplitude, flicker frequency and flicker phase of the periodically varying light source (e.g., as shown in Fig. 4A the flicker is a function of amplitude, frequency, and phase based on the varying light source, Col. 9 lines 6-10, figure 4a teach that the output of dividing circuit 4 (figure 1) on the ordinate axis represents flicker and abscissas represents line number at a frame. Therefore in figure 4a, flicker is shown to be varying with amplitude, frequency and phase of a periodically varying light source. Line numbers of a particular frame represent the luminance

level of particular pixel on which light from the varying light source is converted into electrical energy also stated in col. 8 lines 28-32) and

processing said image data using said flicker function so as to remove said image artifacts from said image (e.g., column 15, lines 48-51; column 16, lines 5-13).

Kasahara fails to disclose image data comprises an image data array comprised of a plurality of rows of image data, and wherein said processing step comprises dividing said image data by said flicker function on a row-by-row basis. However Iwakawa discloses said image data comprises an image data array comprised of a plurality of rows of image data, and wherein said processing step comprises dividing said image data by said flicker function on a row-by-row basis (e.g., Examiner notes that the scene is scanned by the one-dimensional image sensor so as to generate two-dimensional image data wherein each row is corrected by dividing the image signal by the flicker function; column 5, lines 14-19 and 41-67, Also See col. 4 lines 12-32, figure 3).

Therefore taking the combined teachings of Kasahara and Iwakawa, it would be obvious to one skilled in the art at the time of the invention to have been motivated to have an image data array comprised of a plurality of rows of image data, and wherein said processing step comprises dividing said image data by said flicker function on a row-by-row basis in order to prevent the flicker due to line-by-line deviation (col. 5 lines 64-67).

[Claims 7 and 8]

In regards to claims 7 and 8 see Examiner's notes on the rejection of claim 1 above.

[Claims 17, 20 and 21]

In regards to claims 17, 20 and 21 see Examiner's notes on the rejection of claim 1.

3. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over (Kasahara et al. (US Patent # 6,710,818), Iwakawa et al. (US Patent # 6,208,433) and in further view of (Applicant's Admitted Prior Art, herein AAPA).

[Claim 10]

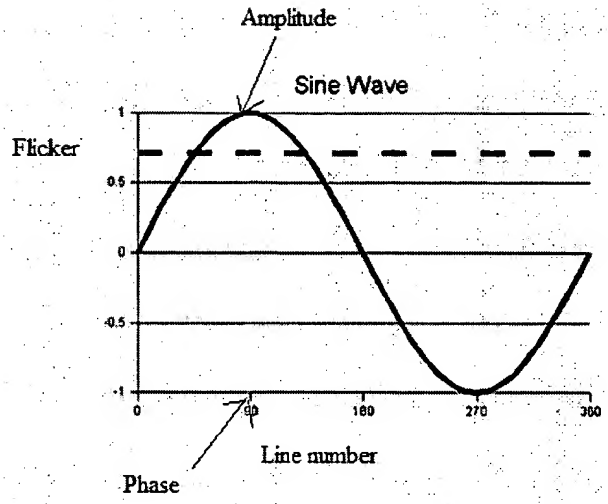
In regards to claim 10 Kasahara in view of Iwakawa does not disclose that the image data is collected from a CMOS image sensor utilizing a rolling shutter to provide exposure control. Examiner notes the specification on page 2, lines 7-12 wherein AAPA discloses that it is known to utilize a CMOS image sensor with a rolling shutter to provide exposure control. AAPA further discloses on page 3, lines 1-7 that in using a rolling shutter, since each row of image data is produced at a different time, under a varying light source flicker will be produced. Examiner notes that scanning a scene using a linear image sensor is functionally equivalent to using an image sensor with a rolling reset, since each row of image data is produced at a different time and the scene is sequentially scanned. Examiner notes that one skilled in the art would clearly recognize that replacing the moving mirror and linear image sensor with a CMOS image sensor utilizing a rolling reset would reduce the number of mechanical parts and further would enable a reduction in the frame period for scanning the scene since multiple lines are being exposed in parallel using a rolling reset. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have replaced Kasahara's linear image sensor in view of Iwakawa with a CMOS image sensor with a rolling shutter to provide exposure control in order to reduce the number of mechanical parts and further enable a reduction in the frame period for scanning the scene as would be recognized by one skilled in the art.

(10) Response to Argument

4. Appellant argues with regards to claim 1 that Kasahara does not disclose "determining a flicker function, wherein said flicker function is a function of flicker frequency, flicker amplitude and flicker phase of said light source". The Examiner respectfully disagrees.

Kasahara teaches determining a flicker function that models light emission of the periodically varying light source (e.g., column 8, line 28 – column 9, line 10), wherein said flicker function is a function of flicker amplitude, flicker frequency and flicker phase of the periodically varying light source (e.g., as shown in Fig. 4A the flicker is a function of amplitude, frequency, and phase based on the varying light source, **Col. 9 lines 6-10, figure 4a teach that the output of dividing circuit 4 (figure 1) on the ordinate axis represents flicker and abscissas represents line number at a frame. Therefore in figure 4a, flicker is shown to be varying with amplitude, frequency and phase of a periodically varying light source.**

A sinusoidal wave similar to as shown in figure 4a will have an amplitude, frequency and phase as illustrated in the following figure.



As clearly shown in the above figure flicker on the Y-axis changes with regards to amplitude, phase and frequency of the sine wave, wherein frequency is defined as frequency=1/Time period. Time period is defined as the time it takes for the sine wave to complete one cycle.

5. Appellant argues with regard to claim 1 that Iwakawa does not teach a flicker function signal and also does not disclose wherein said image data comprises an image data array comprised of a plurality of rows of image data, and wherein said processing step comprises dividing said image data by said flicker function on a row-by-row basis. Iwakawa teaches in

figure 3 the principle of the invention wherein the compensated output Vc (x, y) corresponding to a pixel (x, y) on an original copy 31 is represented by the following equation (1):

$Vc(x, Y)=V0*V(x, y)/Vref(y)$ ..... (1)

where Vref(y) represents a flicker detection signal, V(x, y) represents a video signal of the original copy 31 (col. 4 lines 12-32). Therefore Vref(y) that is a flicker detection signal is a flicker function signal as explained in figure 3 according to a principle of the invention and teaches dividing said image data by said flicker function. Different rows are shown in figure 5a. Thus Iwakawa does teach dividing said image data by said flicker function on a row-by-row basis.

6. Appellant argues with regards to claim 1 that Vref represents ambient light that is free from flicker and therefore does not represent a flicker function of any type (pp 17 of appeal brief). The Examiner respectfully disagrees. Iwakawa clearly states that illumination 30 (figure 3) is composed of two types of light, for example, **flicker containing fluorescent lamp** and ambient light free from flicker such as sunlight (col. 4 lines 14-21, figures 3 and 4). Illumination 30 falls on image sensor 9 and is outputted as Vin. Therefore Vin contains both **flicker containing fluorescent lamp** and ambient light free from flicker such as sunlight. If Vin does not comprise flicker then the compensated output Vc cannot be free of flicker (col. 5 lines 40-67, specifically col. 5 lines 64-67).

7. Appellant argues with regards to claim 1 that Kasahara and Iwakawa describe different mechanisms for compensating flicker and there is no suggestion in either references to combine them. The Examiner respectfully disagrees. Kasahara uses the dividing results of SUM n,I and AVE n,I to generate flicker wherein sum n,I is the integrating result of every horizontal pixel line

and AVE n,I is the average of all the SUM terms. Therefore flicker is generated by dividing Sum/ AVE. With Iwakawa seeking to remove flicker by dividing said image data by said flicker function on a row-by-row basis, one of ordinary skill in the art would have had a reasonable expectation that in combining the theories of Kasahara and Iwakawa would have led to a removal of flicker from the illumination than either one alone.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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